REMARKS

Claims 1-24 were pending in this application.

Claims 1-3, 6, 9, 10, 12, 15, 16, 18, and 22-24 have been rejected.

Claims 4, 5, 7, 8, 11, 13, 14, 17, and 19-21 have been objected to.

Claim 25 has been added.

Claims 1-25 are now pending in this application.

Reconsideration and full allowance of Claims 1-25 are respectfully requested.

I.   ALLOWABLE CLAIMS

The Applicants thank the Examiner for the indication that Claims 4, 5, 7, 8, 11, 13, 14, 17, and 19-21 would be allowable if rewritten in independent form to incorporate the elements of their respective base claims and any intervening claims. Because the Applicants believe that the remaining claims in this application are allowable, the Applicants have not rewritten Claims 4, 5, 7, 8, 11, 13, 14, 17, and 19-21 in independent form.

II.   REJECTION UNDER 35 U.S.C. § 103

The Office Action rejects Claims 1-3, 9, 10, 15, 16, 22, and 23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2004/0024568 to Eryurek et al. ("*Eryurek*") in view of U.S. Patent Publication No. 2003/0019297 to Fiebelkorn et al. ("*Fiebelkorn*"). The Office Action rejects Claims 6, 12, 18, and 24 under 35 U.S.C. § 103(a) as being unpatentable over *Eryurek* and *Fiebelkorn* in view of U.S. Patent No. 5,646,600 to Abdel-

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Malek et al. ("*Abdel-Malek*"). These rejections are respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP § 2142; In re Fritch, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)*). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP § 2142; In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)*). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP § 2142; In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)*). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Grabiak, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)*).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)*). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references

when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (*MPEP § 2142*).

A.   IDENTIFICATION OF CORRESPONDING ELEMENTS

As a preliminary matter, the Applicants respectfully note that the Office Action does not identify the specific elements of the cited references that allegedly correspond to each element of the claims. Rather, the Office Action simply identifies paragraph numbers and line numbers in the cited references. Also, many of the citations are repeated for multiple claim elements, such as when the same paragraphs and lines from *Fiebelkorn* are cited against each of the last three paragraphs of Claim 1.

To avoid any possible confusion regarding how the references are cited against the claims, the Applicants respectfully request that the Patent Office specifically identify which elements of *Eryurek* and *Fiebelkorn* allegedly correspond to each element in the claims. For example, the Applicants respectfully request that the Patent Office specifically identify which element in *Eryurek* allegedly anticipates the "one or more indicators ... at each of a plurality of resolution levels" as recited in Claims 1, 9, 15, and 22. Similarly, the Applicants respectfully request that the Patent Office specifically identify which element in *Fiebelkorn* allegedly anticipates the "plurality of indexes associated with the resolution levels" as recited in Claims 1, 9, 15, and 22.

The Applicants respectfully make this request in order to assist the Applicants in

understanding how the Patent Office is proposing to modify *Eryurek* with the teachings of *Fiebelkorn* to render the Applicants' claimed invention obvious. Without this, the Applicants are forced to guess which elements in *Eryurek* and *Fiebelkorn* allegedly correspond to the elements of the claims.

B. CLAIMS 1-3, 9, 10, 15, 16, 22, AND 23

Regarding Claims 1, 9, 15, and 22, the Office Action asserts that *Eryurek* anticipates identifying "one or more operating characteristics" associated with a valve and identifying "one or more indicators" of a possible valve defect at each of a "plurality of resolution levels." (*See, e.g., Office Action, Page 2, Last paragraph – Page 3, First paragraph*). The Office Action then asserts that *Fiebelkorn* discloses the remaining elements of Claims 1, 9, 15, and 22 and that it would be obvious to modify *Eryurek* with *Fiebelkorn*. (*See, e.g., Office Action, Page 3, Second paragraph – Last paragraph*). However, the Office Action fails to establish that the proposed *Eryurek-Fiebelkorn* combination discloses, teaches, or suggests all elements of Claims 1, 9, 15, and 22.

First, *Eryurek* and *Fiebelkorn* appear to detect the same problem (cavitation in a valve) using signals at different frequencies. *Eryurek* analyzes a signal component between 45Hz and 55Hz to identify cavitation. (*Par. [0028]*). In contrast, *Fiebelkorn* attempts to identify faults using signals above 50kHz, sometimes above 200kHz or 500kHz. (*Pars. [0010] and [0016]*). *Fiebelkorn* expressly recites that lower frequencies are ignored by filtering them out of the signals being analyzed. (*Par. [0017]*). In fact, the highest frequency signal identified in *Eryurek*

is a 10kHz signal (*Par. [0032]*), which is far below the cut-off frequency of 50kHz used in *Fiebelkorn*.

The Office Action fails to explain how these two completely different techniques could be combined to identify valve faults. This is particularly difficult since one of the techniques (*Fiebelkorn*) appears to filter out and ignore the exact data that is used in the other technique (*Eryurek*). Because of this, the Office Action cannot establish that one skilled in the art would modify *Eryurek* with *Fiebelkorn* to detect valve problems.

Second, Claims 1, 9, 15, and 22 recite that one of a "plurality of resolution levels" is selected "using at least one of [a plurality of] indexes." It is unclear which element of *Fiebelkorn* is relied upon as allegedly anticipating the "plurality of indexes" recited in Claims 1, 9, 15, and 22. *Fiebelkorn* does recite that "signal conditioning" is used to separate a measurement signal into "signal components" associated with different frequency ranges. (*Par. [0039]*). Each signal component is then processed further, such as by comparing the intensity of a signal component against a "comparison value" and outputting a fault indication signal if necessary. (*Par. [0041]*).

The Office Action may be taking the position that the "signal components" in *Fiebelkorn* anticipate the "plurality of indexes" recited in Claims 1, 9, 15, and 22. However, *Fiebelkorn* never discloses that one of multiple resolution levels is "selected" using the signal components of *Fiebelkorn*. For example, *Fiebelkorn* refers to different "frequency ranges" (denoted "D," "E," "F," and "G") that are associated with cavitation noises. (*Par. [0039]*). *Fiebelkorn* never recites that one of these "frequency ranges" is selected using the "signal components" in the frequency

ranges. Instead, it appears that *Fiebelkorn* operates by comparing all of the "signal components" in those frequency ranges with "comparison values" to determine if a valve fault exists. (*Par. [0041]*).

In fact, *Fiebelkorn* expressly teaches away from any type of "selection" of a "resolution level" as recited in Claims 1, 9, 15, and 22. For example, *Fiebelkorn* clearly recites that an acoustic signal is divided into a "low frequency portion" and a "high frequency portion," where the "high frequency portion" is used to determine the likelihood of a valve fault. (*Par. [0009]*). In this case, there is no "selection" of a resolution level "using" one or more indexes. Rather, the "high frequency portion" is always used, without reference to a selection that is based on "one or more indexes." As a result, *Fiebelkorn* never discloses, teaches, or suggests selecting "one of the plurality of resolution levels using at least one of the indexes" as recited in Claims 1, 9, 15, and 22.

Third, it appears that the Office Action is taking the position that the "signal components" (denoted X_1, X_2, X_3, X_4, ... X_N) in *Eryurek* anticipate the "one or more indicators ... at each of a plurality of resolution levels" as recited in Claims 1, 9, 15, and 22. However, Claims 1, 9, 15, and 22 recite that a "plurality of indexes associated with the resolution levels" are generated, where the indexes are "based on the one or more indicators." Because of this, in order to render Claims 1, 9, 15, and 22 obvious, the Office Action must show that *Fiebelkorn* would use the "signal components" of *Eryurek* (the alleged "one or more indicators ... at each of a plurality of resolution levels") to generate the "signal components" of *Fiebelkorn* (the alleged "plurality of indexes associated with the resolution levels"). The Office Action must make this

showing in order to establish a proper § 103 rejection of Claims 1, 9, 15, and 22, but the Office Action cannot make this showing.

Fiebelkorn and *Eryurek* appear to operate in a similar manner. *Fiebelkorn* recites that the intensities of "signal components" associated with different frequency ranges are compared against "comparison values" to generate fault indication signals if necessary. (*Par. [0041]*). In *Eryurek*, the signal components (denoted X_1, X_2, X_3, X_4, ... X_N) are compared against various signal strength limits (denoted $Limit_1 - Limit_4$) to determine if a fault is detected. (*Par. [0029]*).

The Office Action cannot show that the "signal components" of *Fiebelkorn* (the alleged "plurality of indexes associated with the resolution levels") would be based on the "signal components" of *Eryurek* (the alleged "one or more indicators ... at each of a plurality of resolution levels"). Rather, it appears that both *Eryurek* and *Fiebelkorn* generate their "signal components" so that they represent different frequencies or frequency ranges contained in a parent or main signal. In fact, the signal components in *Fiebelkorn* are clearly generated by running a measurement signal through a high-pass filter 31 or a bandpass filter 32 of an acoustic sensor 20. (*Par. [0039]*). The Office Action contains no explanation as to how the "signal components" of *Fiebelkorn* could be generated and be based on the "signal components" of *Eryurek*. Without this showing, the Office Action cannot establish that *Fiebelkorn* discloses generating a "plurality of indexes associated with the resolution levels" based on the "signal components" of *Eryurek* (the alleged "one or more indicators ... at each of a plurality of resolution levels").

Fourth, the Office Action asserts that *Fiebelkorn* discloses determining an "overall

probability of a valve defect" using "at least one of the indexes that is associated with the selected resolution level." However, *Fiebelkorn* simply recites that "fault indication signals" are generated if the intensities of "signal components" exceed "comparison values." (*Par. [0041]*). Nothing in *Fiebelkorn* recites determining an "overall probability of a valve defect" as recited in Claims 1, 9, 15, and 22.

For these reasons, the Office Action has not established a *prima facie* case of obviousness against Claims 1, 9, 15, and 22 (and their dependent claims). Accordingly, the Applicants respectfully request withdrawal of the § 103 rejection and full allowance of Claims 1-3, 9, 10, 15, 16, 22, and 23.

C.   CLAIM 24

First, Claim 24 recites "determining an overall probability of a valve defect using at least one of the one or more indexes." As noted above, *Fiebelkorn* simply recites generating "fault indication signals" when the intensities of "signal components" exceed "comparison values." (*Par. [0041]*). *Fiebelkorn* never discloses, teaches, or suggests determining "an overall probability of a valve defect" as recited in Claim 24.

Second, Claim 24 recites identifying "one or more indicators of a possible defect in [a] valve," identifying "one or more stiction patterns using the one or more indicators," and "generating one or more indexes associated with one or more of the stiction patterns." As noted above, the Office Action appears to rely on the "signal components" of *Eryurek* as anticipating the "one or more indicators of a possible defect in [a] valve" as recited in Claim 24. The Office

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Action also appears to rely on the "signal components" of *Fiebelkorn* as anticipating the "one or more indexes" as recited in Claim 24.

The Office Action must explain how the "signal components" of *Fiebelkorn* could represent one or more indexes associated with one or more "stiction patterns." Only then could the Office Action show that the "signal components" of *Fiebelkorn* anticipate the "one or more indexes associated with one or more of the stiction patterns" as recited in Claim 24. However, as noted above, *Fiebelkorn* clearly recites that the "signal components" are generated by running a measurement signal through a high-pass filter 31 or a bandpass filter 32. The Office Action contains no explanation for why passing a signal through a high-pass or bandpass filter would anticipate "generating one or more indexes associated with one or more of the stiction patterns" as recited in Claim 24. Moreover, the Office Action contains no explanation as to how *Fiebelkorn* could be modified so that the "signal components" of *Fiebelkorn* would be associated with one or more identified stiction events.

Third, the Office Action fails to explain how a person skilled in the art could modify the system of *Fiebelkorn* to detect stiction events as is allegedly done in *Abdel-Malek*. The whole purpose of *Fiebelkorn* is to analyze signals above 50kHz to detect valve leaks and cavitation. (*Par. [0011]*). Presumably, any "stiction" in a valve would occur at a far smaller frequency than 50kHz. The Office Action fails to explain how the system of *Fiebelkorn* would be capable of generating "signal components" (the alleged "one or more indexes") that are "associated with one or more of the stiction patterns," assuming that the stiction patterns would be filtered out of the signal being processed in *Fiebelkorn*.

For these reasons, the Office Action has not established a *prima facie* case of obviousness against Claim 24. Accordingly, the Applicants respectfully request withdrawal of the § 103 rejection and full allowance of Claim 24.

III.   NEW CLAIM

The Applicants have added new Claim 25. The Applicants respectfully submit that no new matter has been added. At a minimum, the Applicants respectfully submit that Claim 25 is patentable for the reasons discussed above. The Applicants respectfully request entry and full allowance of Claim 25.

IV.   CONCLUSION

The Applicants respectfully assert that all pending claims in this application are in condition for allowance and respectfully request full allowance of the claims.

SUMMARY

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@davismunck.com.*

The Applicants have included the appropriate fee to cover the cost of this AMENDMENT AND RESPONSE. The Commissioner is hereby authorized to charge any additional fees connected with this communication (including any extension of time fees) or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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